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NEW YORK SUGAR MARKET.—Willett & Gray report under date of Aug. 22:—The nominal quotation for centrifugals has been 4c for 96° test throughout the week, but business on this basis has been impracticable during most of the week, and importers having sugar arrived unsold have been forced to put them into warehouse and wait for a market. An offer to reduce price below 4c in order to effect sales made no impression on buyers who prefer to remain entirely out of the market for the present and until a better demand for the refined product exists. At present the production continues ahead of the consumption, notwithstanding that some refineries have been closed for an indefinite period. The Mollenhauer and the New York refineries, of the National Company, are closed; but the American Sugar Refining Co. and Arbuckle houses are kept going.

Czarnikow reports, Aug. 23:—The raw sugar market this week showed general weakness. The collapse of the European beet markets, which continued on the downward path until old beets touched 8s. 3d. f. o. b., coinciding with a very poor demand here for refined and comparatively large arrivals, made matters worse than in any previous week this year. Refiners have sufficient raw sugar for present wants and, although they could this week have secured some Java cargoes at a very moderate price, they did not take advantage of these cheap offerings. * * * If in August, 1898, when visible supplies were 1,729,264 tons, and prices were 2⅝c. for centrifugals, and 9s. 10½d. for 88° beets, is there sufficient ground for prices in 1901 being only 2 5-16c. for 96° centrifugals and 8s. 7½d. c. f. for beets, when visible supplies are, in round numbers, 181,000 tons less, annual consumption in the meanwhile having been enormously augmented.

The solution of the present sugar market is probably this—European sugar speculators have become frightened by the

excessive beet crop and refuse to deal in the article. As soon as the European beet crop is harvested, confidence will be restored, and the market will resume its normal condition.

Regarding the disturbance in the Pacific coast sugar market, Willett & Gray's Statistical says: "Our letters and reports from San Francisco show that the recent cut in refined of half a cent a pound was brought about by California beet sugar manufacturers departing from previous custom of manufacturing raw beet sugar and selling it to the refinery controlled by Mr. Claus Spreckels, and now manufacturing refined sugar to sell to the trade in competition with San Francisco refined sugar. As the profitable sugar business of the Pacific coast is confined within certain limits by the chain of the Rocky mountains, this action results in losing a certain amount of that trade by Mr. Claus Spreckels, and will naturally cause a fight to control it. Mr. Spreckels has the reputation of being a good fighter, and the indications are that, unfortunately, the beet factories will get no larger price for their refined than Mr. Spreckels is willing to pay them for raw sugar. Mr. Spreckels is acting in this fight independently of the Sugar Trust, and the market is only affected by it in the territory reached by the California beet sugars. It is a pity that the situation in that territory was disturbed, the only gainers being the actual consumers, who will get cheap sugar —cheaper than paid by the people in the East."

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DETERIORATION OF RAW CANE SUGAR IN TRANSIT OR DURING STORAGE.

A paper read at the Congress of Java Sugar Manufacturers in 1900, by Mr. Prinsen Geerligs, concluded that the cause of inversion must be sought in the action of micro-organisms coming from without, which action could only take place when the sugar was damp. The sugar might be damp because of having been delivered in that state by the manufacturer, or because of having absorbed moisture from the atmosphere owing to the hygroscopic nature of the molasses adhering to the crystals. To prevent deterioration, the sugar should be delivered dry and non-hydroscopic; it remains to be seen whether this latter condition should be sought to be attained in the nature of the sugar, or in that of the packing. In the

discussion which followed the reading of the paper, the conclusion was arrived at that the manufacture of "sterile" sugar was not feasible, and centrifugalling with injected superheated steam was also considered impracticable, but it was thought that, judging by the results of some not very conclusive experiments, the disinfection of the packing material would effect what is desired. There would appear to be considerable danger in the use of certain antiseptic substances, subject to chemical or other change, or interfering with the process of refining, or even altering the character of the sugar, and the best means, after all, would seem to be to protect the sugar as much as possible from moisture by proper packing and suitable covering when stored or in transit.—Int. Sugar Journal.

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THE SUGAR WAR AND THE LOW PRICE OF SUGAR.

Representatives of the American Beet Sugar Company admit that there is war between the Sugar Combine and the Oxnards. It is not at all likely, however, that the East will feel the effects of the fight now being waged between the Pacific Coast refineries. The cut of ½ cent a pound in sugar is equivalent to a reduction from 5.47 to 5 cents a pound, or 35 points below the actual selling price of sugar in the New York market. The reduction is one of the widest ever made. It is said that the Sugar Combine notified brokers that unless they handled their sugar exclusively they could not handle it at all. As the American Sugar Refining Company refines sugar every day in the year, while the beet sugar factories are in operation only three or four months a year, many brokers took the advice of the Sugar Combine's representatives and refused to handle the products of the beet sugar companies. The beet sugar companies got back at Spreckels by granting liberal concessions to jobbers. It was that action that prompted Spreckels to make the reduction.

Speaking of the Pacific Coast situation, a representative of a beet sugar company said: "Spreckels believes that he will hurt the Oxnards, but he will find that he is greatly mistaken. In fighting the American Beet Sugar Company he is striking at every beet sugar company in the United States, as well as thousands of farmers who depend upon the beet sugar industry for a living. The only concerns that are affected at the

present time are those located on the Pacific coast, but all of them will feel the effects of the war when the harvest of beets begins. A bitter feeling has already existed against the Sugar Trust. A movement is already on foot to petition Congress to take off the duty on refined sugar and put on a higher duty on raw sugar. If this is done the profits of the combine will be cut down considerably, but at the same time it will encourage the development of an industry which, although in its prime, is giving employment to thousands of people. The American Beet Sugar Company is in a stronger position to meet the reduction than the American Sugar Refining Company. It has refineries in California, Colorado and Nebraska, which means a considerable saving in the transportation of sugar to interior points. Besides the fact that beet sugar companies are located in all the prominent Western cities, means a large saving in the interest account to jobbers who patronize the beet sugar companies."

The American Beet Sugar Company produces in the neighborhood of 130,000,000 pounds of sugar a year, but has a capacity of 200,000,000. The production of the Spreckels' refinery exceeds 500,000,000 pounds a year. There are about forty beet sugar refining companies in the United States, located in twenty-five different States.—Boston Herald.

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Free trade now exists between Porto Rico and the United States, the same as between the United States and Hawaii. It is, of course, a large premium in favor of sugar in common with other island products, and will result in giving a great impetus to every branch of industry, including sugar, molasses and all other products of the island.

A writer in the Chemiker Zeitung, speaking of adulteration in German chocolate, says that so-called "guaranteed pure" chocolates containing not more than 12 to 20 per cent of cocoa have of late been no rarity, and the Federal Government has tried to stop this by ordering that no drawback should be allowed on chocolates not containing a minimum quantity of 35 per cent of cocoa. The export of chocolate from Germany from August 1, 1899, to July 31, 1900, was over 42,000,000 lbs.

The payment, by a sugar estate in Mauritius, of the unusual dividend of 75 per cent on the subscribed capital, has excited some comment on the Continent, as well it may. The estate

in question is a fine one, was bought cheaply and has been worked economically and intelligently; there has been an extremely good crop, and the sugar was sold at good prices. The case is, however, quite exceptional, and cannot be taken as any indication of the general state of the industry in Mauritius.

One of the most valuable cargoes ever shipped from an American port to Australia was taken on board a steamer recently at a Brooklyn wharf. Its value exceeded $1,000,000, and it included twenty-four locomotives built in Philadelphia for the Government railways of New South Wales. There is a great foreign demand for American locomotives, which are said to be superior to any made elsewhere. Russia alone has ordered over two hundred of them.

The average cost of manufacture in 115 German sugar factories is stated to be $7.80 per ton of beets. The profit per ton is stated to be $3.25 per ton. No wonder that the sugar industry there has developed so rapidly. It is said that the cost of manufacture is being reduced each year.

Excursionists are leaving by every outward bound steamer, and on arrival at San Francisco are often puzzled as to what railroad route they should take from that point eastbound. No route will be found more pleasant and safe than the old and reliable Union Pacific via Ogden, Omaha and Chicago and its connections, which give a perfect service without change of cars.

The weather on these islands has been unusually dry for the past six months, and some losses from drought will be reported; but as a few of the larger plantations are supplied from artesian sources, the total sugar yield will probably not be less than last year's outcome, several new estates having been added to the list this year, for the first time. The artesian wells help the growing cane during the warm summer and autumn months and assist to insure the crop against any serious shortage from a dry season.

Smyrna Figs.—Mr. Geo. C. Roeding, of Fresno, Cala., who a year or two ago introduced the Smyrna Fig into that State, reports that his crop this year will exceed 150,000 pounds of dried figs. The trees stood the cold snap of last winter re-

markably well, as is shown by his crop. At the same time he has disposed of about 150,000 cuttings to applicants. This is the variety of figs that should be cultivated in Hawaii, though we are not sure but that it is already here. Smyrna Figs (Blastophaga) are the choicest and most profitable of any grown. The Kona district on Hawaii is most admirably adapted to the cultivation and curing of figs, and now that no duty is levied in California on dried fruits grown here, there is no good reason why the business should not be carried on here successfully.

Louisiana planters have been discussing the question of cane and beet sugar, and say that a well known professor declares himself in favor of the blindfolding method with various sugar solutions, and taking an average of the judgment as to any apparent sweetness. Such tests should be made side by side, not only with two sugars of the same polarization, but having been refined by identical methods. If this factor is not taken into consideration the results obtained may be very misleading. There remains a whole field open for a series of investigations to show just within what limits refining process of various countries influence the sweetening power of a given weight of sugar. This question has never been discussed in the leading text books.—Ex.

The forest fires in Hamakua, which have been burning for two weeks or more, had not been extinguished at the latest date, and have laid waste some ten thousand acres of forest and pasture land and growing cane fields. The fire originated, it is thought, by throwing a lighted match among the dry leaves, or in some other careless way, and not purposely. The dry condition of the land and the lack of water have been the chief causes of this serious disaster, which a little effort at the start might have prevented. The value of the burnt timber alone may be over one million dollars.

The United States is the largest sugar-consuming country in the world, and is situated within a few hours' sail of Cuba's rich sugar estates. What Cuba needs in this line of industry is capital. The United States can supply this requisite without stint, and will do so even under the terms of the Dingley tariff, much more under a system of free trade. Here is a per-

sistent force of self-interest, which coincides in some degree also with the public interest, and which will work untiringly and without ceasing for the introduction of raw sugar from Cuba free of duty, either with or without the annexation of the island. * * * To admit the sugar of Cubans free and to tax that of the other West Indies would make Cubans rich, and would ruin the British islands, with the possible exception of Jamaica and Barbados, which are not wholly dependent on sugar.

LARGEST SUGAR REFINERY IN THE WORLD.—The "Sucrerie Belge" asks who holds the record? Is it little Belgium, the great America or our sympathetic neighbor on the south (France). The last number of the Journal des Fabricants de Sucre publishes without observation the following lines from an American paper:

"Since the construction of the large refinery at Salinas by Mr. Claus Spreckels, the United States possesses the largest factory of sugar in the entire world. They will work 3,000 tons beets and produce 400 tons raw sugar per day."

Although it is not a thing of extraordinary importance, we nevertheless wish to vindicate ourselves in this regard as our country possesses a sugar refinery more powerful in daily work than that recently constructed by the American Sugar King. In effect Wânze works daily 3,500,000 kilos (3,500 tons of 2,240 lbs. each) of beetroot and produces nearly 4,000 sacks crystalized, besides about 1,000 bags raw. France also possesses several large factories but none have attained the size of Wanze.

It may not be without interest to know that Mr. Paul and Frantz Wittouck are not only the principal owners of the factories of Wanze, but they have several other factories quite as important. The various factories under control of these men represent a capital amounting to almost 30,000,000 francs, and produce daily the colossal figure of 10,000 bags raw and crystalized, without counting the refinery of Tirlement. So it can be seen that there are sugar kings elsewhere than in America.

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To have on one's table fresh vegetables and fruit, to call a few acres of land "mine" is a life that can not but be attractive to every man.

THE "WESTON" CENTRIFUGAL MACHINES.

Amongst the exhibitors of centrifugal machines on view at the Glasgow International Exhibition, the well-known firm of Watson, Laidlaw & Co. was the most representative. The original makers, as is well known, of the "Weston" type, they have made centrifugals a specialty, and their latest productions are well worth an inspection. A special feature of these machines is the patent method of driving by water power. This has numerous advantages over the belt gearing method, of which the chief are: Less space required; fewer working parts; no loss of power in transmission (which is very much the case with all machinery where belts are used); automatic regulation of power, thereby ensuring economy and a constant speed. To the ordinary observer with some mechanical knowledge, a direct-acting electric motor would appear to possess equally all these advantages, but practice goes to show that such a supposition is erroneous. Repeated attempts have been made in this country and on the Continent to adapt electric motive power, but so far without success. There is besides the question of first cost, a point very much in favor of the hydraulic system, and in these days of keen competition, when a fractional sum per cwt. may represent the total profit on the manufacture of sugar, this must necessarily have considerable influence on the decision of the factory owner or manager. Again, with the hydraulic motor it is possible to vary the time in which the centrifugal attains its maximum speed, in order to obtain the best results in drying, and when the maximum speed in reached, it can be uniformly maintained. * *

Among the many improvements which have been introduced with the "Weston" centrifugal machine, not the least are the facilities which were given for the rapid attainment of full speed, and this improvement was of immense service in accelerating and perfecting the treatment of good-free-drying sugars. While, however, the "Weston" centrifugal came largely into use on vacuum pan estates, it was found that the older-fashioned machines were retained and preferred, for the treatment of low sugars. The reason for the non-success of a quick acceleration in the treatment of a low sugar is not far to seek, if we consider the way in which high centrifugal force will act upon varying qualities of masse-cuite. The first effect in all cases is to cause the molasses which is resident in the lay-

ers of masse-cuite nearest the perforated shell of the basket, to fly off, leaving a layer of dried sugar against the shell. If the sugar is of good grain, this dried layer will remain open and porous, and will present no obstacle to the passage of the remainder of the molasses; but if the sugar is poor, small grain, the outer layer from which the molasses is first drawn will not remain porous, but will become packed into a dense, close mass, through which the rest of the molasses will not be able to easily find its way. It is this packing of the sugar against the basket which makes the curing of low sugar different from the curing of good vacuum pan sugar.

The remedy, of course, is to cause the centrifugal to get up speed slowly so as to allow the molasses to drain off gradually and to be almost all drained off by the time full speed has been attained.—Int. Sugar Journal.

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BRITAIN AND AMERICA'S COMMERCIAL RELATIONSHIP.

A right royal welcome was accorded to the delegates from the New York Chamber of Commerce recently in England by invitation of the London Chamber of Commerce for the purpose of friendly conference. It was fitting that His Majesty should show by honoring his visitors, that Great Britain has nothing but the most amicable feelings toward her great commercial rival, and that the "boycott" proposed by certain Continental Powers does not meet with either approval or sympathy in the United Kingdom. The "boycott" in question, curiously enough, was predicted ten years ago by Lord Salisbury, when he stated that the foremost commercial nations would reach such a stage of rivalry that the world would be face to face with a war of commercial tariffs. More recently, in December, Lord Roseberry, in addressing the students of Glasgow University, stated that the nations in the future would be more likely to suffer from the war of trade than from military wars for territorial objects, and he instanced the growing competition with America and Germany, in the former case arising from the attention paid to scientific methods, and in the latter as the result of the huge fortunes made, and large trusts.

Continental nations have evidently just become aware, through the attentions paid them by Mr. Pierpont Morgan and other great monopolists, of the danger their commerce is in as

the result of the progressive policy of the United States. As a first step to check America's advance, they advocate resort to the barbarous method of the "boycott." Great Britain, however, will be no party to such a policy as, if it cannot hold its own by legitimate means, it would merely be an attempt to sweep back the ocean with a broom to adopt shady tactics of the nature proposed. That Europe has cause for its present state of trepidation is evident from the most recent statistics of the nations' export trade. During the past five years no European nation has come near Great Britain in the amount and value of her export trade; it has only been rivaled by the United States which has made steady progress until, if we mistake not, last year their figures exceeded those of the Mother Country for the second time in history. The United Kingdom led the United States in 1894 by nearly $250,000,000. In 1897 the States had so rapidly advanced that they were but $60,000,000 behind. Since then there has been close competition between the two nations for the foremost place. In 1898 the United States took first place, its exports exceeded those of the United Kingdom by nearly $100,000,000. In 1899 Great Britain again stood at the head of the list, and her exports exceeded those of her rival by nearly $35,000,000. Last year for the eleven months ending November—the latest figures available—the United States again led by $5,473,670. But this great distinction of heading the list of the world's exporting nations, which until 1898 belonged to Great Britain, although it shows the magnificent headway which the United States has made, only partially tells the story of the wonderful growth of its export trade.

Comparing the growth of exports of the last quarter of the century with those of the other great nations it is seen that France shows no increase in the export of her domestic merchandise during the latter period of her history. Germany shows an increase of 50 per cent, the United Kingdom an increase of nearly 40 per cent, while the United States shows an increase of nearly 200 per cent. Is it, then, a matter for wonder that European nations should exhibit signs of alarm at the great strides which the New World Power is making in supplying the world's needs? If any nation has cause to be jealous it is Great Britain, for as an American Consular report some time ago stated: "Of the $18,000,000,000 worth of commerce done by all nations, England's share is 18.3 per

cent, Germany's 10.8 per cent, and 9.7 per cent falls to the United States. Germany has built up her foreign commerce at England's expense, and the United States, which is just entering the field, is building up a great foreign trade at the expense of both." In spite of this undeniable fact, Great Britain has sufficient sense to refrain from adopting petty backbiting as a retaliatory measure. Her leaders and commercial houses are not shutting their eyes to the danger which is threatening although it is the opinion of some critics that they are, and this International Conference of the members of the Chambers of Commerce which the King has just honored, is an instance of their foresight as much as of the cordiality of the relationship existing between the two great Anglo-Saxon nations of the world.—Ex.

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CHANGE IN ENGLAND'S SUGAR TARIFF.

The tariff on sugars, relating to molasses and glucose, has been changed by the House of Commons, it being made to read as follows:

"Molasses and all extracts of sugar, which cannot be tested by the polariscope if containing 70 per cent and upward, of sweetening matter, 2s. 9d. per cwt.; if between 70 and 50 per cent., 2s; below 50 per cent., 1s. The duty on solid glucose is to be 2s. 9d. per. cwt., and on liquid glucose, 2s."

The effect of this new tariff will be that the English refiners will import greater quantities of low grade sugars than heretofore, and so will produce more soft grades of refined sugars and molasses than has been heretofore furnished.

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THE RUSSIAN SUGAR DUTY.

M. de Witte, the Russian Minister of Finance, is quoted as having said the following regarding the countervailing sugar duty imposed by the United States: "It seems to me that the step taken by the United States cannot be characterized otherwise than as action taken without knowledge of Russian law.

"By the law here the product of sugar is controlled and the amount produced for home consumption is limited. Our object is to prevent a sudden slump in prices. But we must not keep up prices. We insist on a reserve, in order to prevent prices rising unduly and to check speculation. For export, manufacturers may do as they like, although we do not care that

they export, because this gives grumblers and the newspapers an opportunity to say that Russian sugar is bought cheaper out of Russia than in. Russia most certainly does not give a bounty like Germany or France on exported sugar, nor can it be shown that she does. No semblance of bounty is given. What we do is a usage in all countries. We tax sugar for home consumption and not that exported. This is exactly the equivalent of your American spirits and your whisky."

In reply to the above article Secretary Gage commented as follows:

"It is not contended that the remission of the internal taxes by the Russian Government constitutes the granting of a bounty on Russian exports of sugar. The Russian home market for sugar is regulated by the Government, which fixes the price by limiting the amount of sugar that can be sold in the empire. When a cargo of sugar is exported the exporter receives a certificate setting forth that he has exported a given amount of sugar. The amount that a producer is allowed to put upon the Russian market is dependent in large measure upon the certificates of export which he holds.

"These certificates are transferable and have a market value of about ¾ of a cent a pound. These certificates of the export of sugar have recognized value in Russia.

"The Board of General Appraisers has decided that Russian treatment of sugar exports does constitute a bounty within the meaning of our law."

"I think that the effect of the retaliatory action of the Russian government has been greatly exaggerated. The statistics of exports of last year show that all exported goods affected by the Russian retaliation amount in value to only about $600,000. There is no disposition to do anything that would be displeasing to the Russian government. Every member of the present Cabinet prizes the good will and friendship of Russia very highly and we hope for the continuance of good relations between the two governments."

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Certain changes have been made in the construction of filter presses, which consist in placing a special division between the existing frames. The arrangement is such that the juice enters under most favorable conditions. The joint between frames is very simple, and accidents or faulty working are said in a large measure to be entirely done away with.

THE HAWAIIAN SUGAR INDUSTRY.

Sugar culture began on the Hawaiian Islands sixty-five years ago. Up to 1850 the product of sugar, with the crude mills and inferior kettles, was not over one ton per acre. In 1880 the total crop of the islands was reported at only 30,000 tons. The sugar industry was given an impetus by the reciprocity treaty with the United States in 1876, by which all raw sugars were admitted free of duty. It was seriously depressed by the passage of the McKinley bill, which permitted foreign raw sugars to be imported free of duty, and gave a bounty upon domestic sugars. Under the Dingley bill it has enjoyed a period of unprecedented prosperity. Immense improvements were made, consisting of up-to-date capacious machinery in the sugar-house, steam plows and harrows in the field, enormous pumping plants for irrigation, etc. Annexation, which increased the confidence of the public in the future of the industry, and gave higher values to plantation stock, also caused a considerable increase in the price of labor, the latter being the largest factor which enters into the expense of sugar-making. Sugar is cultivated on the islands of Hawaii, Maui, Oahu and Kauai. The table lands surrounding the islands at an elevation of from 20 to 500 feet constitute the chief sugar areas. Nearly every acre adaptable to cane culture on these four islands is under cultivation, and the probability of a much larger extension of the industry is small. In the effort to obtain the large profits now incident to sugar culture, extensive estates have been recently opened, cultivated, and irrigated. These plantations have about 100,000 acres in cane, one-half of which is harvested every year. The yield per acre varies greatly, according to character of the soil, position of the plantation on the island, whether in the rainy or rainless belts, etc. Under irrigation as much as ten tons of sugar per acre has been the average of one plantation. Upon the rainy side of the islands the yields are less, but so are the expenses, and the net gains from each do not vary much.

There are now fifty factories on the islands manufacturing sugar. These are distributed as follows: Twenty-five on Hawaii, nine on Maui, eight on Oahu, and eight on Kauai. The total sugar produced on the group last year (1900) amounted to 289,544 short tons, distributed as follows: Hawaii, 115,223

tons; Maui, 57,347 tons; Oahu, 53,625 tons; Kauai, 63,348 tons, or a total of 289,544 tons. The total for the year 1901 will probably exceed the last crop.

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CRYSTALIZATION IN MOTION.

Editor Planters' Monthly:—In the August number of the International Sugar Journal is an interesting article by the well known sugar expert, Mr. H. C. Prinsen Geerligs, under the heading of "Conclusions Derived from the Factory Results of Some Java Sugar Plantations," and which takes the form of a very comprehensive statistical report upon "Juice Extraction" and "Clarification and Curing," and contains very complete tabulated statements of results under each of these headings, from fifty-one factories. Juice Extraction comes first, and gives the results from double and treble crushing, with and without shredders or preparatory crushers, and diffusion. The results, in this respect, bear out our own experiences in Hawaii. But what is more interesting to us at the present time, is the comparative statement of results from returning molasses, and cooling masse-cuites in movement, as against the old system of cooling at rest, curing without cooling, and making low grade sugars, and remelting into first sugar. In summing up the results of the various methods of clarification and curing, Mr. Prinsen Geerligs says:

"From this table it appears that this year's results confirm the conclusion formed last year from the figures of the 1899 crop, viz., that the application of the various processes for obtaining all available sugar from the juice in one operation, has not had the effect of increasing the output as compared with the output of those mills which have adhered to the ancient method of making seconds and re-boiling them into first sugar. If we compare the quantity of sugar delivered with the amount of sucrose entering in the juice, which is the only just basis of comparison, and at any rate better than taking the percentage of sugar turned out in 100 parts of cane, we notice the following facts:

"Starting with a mill juice of nearly identical purity, and delivering a product of the same polarization, the mills working with the old methods extracted 88.15 parts of sugar per 100 sucrose in juice. Whilst those having crystalization in movement and returning the molasses extracted 87.32, or about the same percentage. Nor does it make any difference

whether the mixed masse-cuites are cooled at rest or in motion, or are not cooled at all, but cured directly after striking. The advantages of crystalization in movement, together with return of the first molasses into the masse-cuite from syrup, are not to be found in a superior yield, but in the quicker and cleaner way of working and in the doing away with the boiling of seconds or thirds. In every instance, factories working with the carbonatation process obtained an inferior yield, but it must not be overlooked that a portion of these made only white crystals for direct consumption, whereas the other estates only manufactured refining crystals, still containing adherent molasses, the weight of which is of course included in that of the product delivered.

"The qther carbonatating factories, in which sugar polarizing 97.5 is manufactured, show a low yield, for the simple reason that a large part of them usually work up juice which is troublesome to clarify, and therefore requires carbonatation, thus causing their results to be not quite comparable with those of estates on which the juice is easy to clarify by the ordinary process of defecation, and obviously does not so much impede the extraction of the sugar.

"The loss of sucrose in filter-press cakes is not very important, and remains within rather narrow limits. A notable exception is in the case of the factory working with a diffusion plant, which reports only a very trifling loss of sugar in filter-press slime, owing to the mechanical purity of the juice extracted by diffusion."

From Mr. Geerlig's tables it appears that not less than 30 out of the 51 factories included in his investigations, used the process of crystalization in movement and returning the first molasses into the masse-cuites from syrup. We have now in Hawaii quite a number of recently erected modern factories equipped with crystallizers and working under this system. It would be opportune and interesting to know how the results obtained from crystalization in movement in our Hawaiian sugar houses compare with Mr. Prinsen Geerlig's investigations in Java.

GEO. ROSS.

Hakalau, Hawaii, August 4, 1901.

[We hope that some data will be prepared by those planters who have tried this system of crystalization in movement, giving the results of the method as shown by actual tests made

here, to be presented at the annual meeting to be held shortly in this city. No topic that can be presented will attract greater interest than this. Readers will find the system fully described on pages 212 and 365 of volume 19 for the year 1900. —EDITOR.

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SUGAR AND ITS CONSUMPTION.

It is estimated that the quantity of sugar consumed in the United States in food and drink and in the arts and manufactures, during the current year 1901, will be at least 2,300,000 tons, of which Louisiana supplies 300,000, domestic beet growers (probably) 250,000, Hawaii, 300,000, Porto Rico 150,000, and the balance, 1,300,000, is credited to Cuba, Java, Manila and European beet growers. The domestic consumption shows a steady increase from year to year, but it will be several years—perhaps twenty—before the production of American domestic made sugar will overtake home consumption in the United States. Should Cuban sugars come in free, by annexation of that island or by special treaty, it will soon meet the home demand. Cuban sugar is conceded by experts to be among the best sugar made, but it is probably no better than Hawaiian, which for purity of juice and cleanliness in manufacture, is not surpassed by Cuban or any other. It is claimed by Russians that their refined beet sugar is the purest of any; but we do not believe that Russian sugar can surpass Hawaiian, which shows 99° purity. There is evidently considerable rivalry now-a-days in the manufacture of sugar, and it is well that it is so, and that sugar comes from the factories in such perfect condition that it furnishes no ground for suspicion of impurity. As a rule it leaves the refineries absolutely pure, and no harm can follow its free and generous use as a food.

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Two races are to live in this country together, says Brooker T. Washington, and he is an enemy to both who tries to array one race against the other. In proportion as the negro grows intelligent, industrious, and good at heart, in the same proportion will the white men be helped. In proportion as the white man permits himself to oppress the negro, in the same degree is the white man degraded and his progress retarded. In proportion as the white man becomes intelligent and prosperous, in the same degree does he learn to accord the negro the rights that belong to man.

STORY OF THE AMERICA CUP.

In 1851 the regatta of the Royal Yacht Squadron at Cowes was, as it is now, the fashionable yachting event of the year. It took place in August, and on the 22nd of that month a race was arranged for a cup, offered as a prize by the members of the Club, to be sailed for by yachts of all nations, without regard to difference of tonnage. The course was from Cowes round the Isle of Wight. The America entered for this race, and was the only foreign competitor. The start took place at 10 o'clock in the morning, and besides the America there were eight cutters and seven schooners, the majority of them being of the bluff-bowed type. When all allowances were made, the wonderful speed displayed by the America was more than had been anticipated by English yachtsmen. The wind at the start was westerly, very light and variable, and running to the east end of the island the cutters had at the first the advantage, but coming on the wind, the America at once commenced to show her speed. In beating up the back of the island against a strong tide and with little wind, the Arrow got ashore, and the Alarm went to her assistance. These were considered to be two of the best in the fleet. Later in the race two others, Freak and Volante, fouled each other and had to give up. There was now considerably more wind, and the America had established a decided lead to windward, which she continued to improve. She passed through the Needles miles ahead of the Aurora (47 tons), the next yacht, and arrived at Cowes eighteen minutes before her. Thus ended that famous race. The prize then won by the America was some time afterwards presented by her owners to the New York Yacht Club with the idea of "making it perpetually a challenge cup for friendly competition between foreign countries," and that prize is what has ever since been known as the "America Cup."

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THE HARMFULNESS OF BUSH FIRES.

The following pages contain an interesting paper on the "Harmfulness of Bush Fires," read before the late West Indian Agricultural Conference by Dr. H. A. Alford Nicholls, C. M. G., well known as the author of "Tropical Agriculture." To the paper is added a summary of the discussion that took place at the Conference. The latter affords additional infor-

mation and will, it is hoped, lead to a wider appreciation of a very important subject.

It is established that the careless use of fire has largely contributed to destroy forest growth all over the West Indies. The bare, brown and barren appearance of the lower slopes so characteristic, especially of the northern islands, is due to the fact that the original forest has been cleared, the soil exhausted and afterwards abandoned. Directly seedling trees and small growth show themselves and there is a chance of the land being again covered with forest, the cutlass and the firestick once more appear, and everything is reduced to ashes. This process continually repeated has not only destroyed the vegetation, but has also gradually altered the climate. Without shade the ground hardens, moisture rapidly dries up and springs and streams diminish.

In clearing land for permanent plantations, the question has often been asked: Is fire necessary in all cases? In clearing light forest, or secondary growth, it is admitted fire is not necessary. It would be better to dispense with it altogether. On the other hand, in heavy woodland, or in virgin forest, in moist districts, the use of fire is not only necessary, but essential before the land can be suitably brought into cultivation. The aim should be not to prevent the exceptional use of fire in clearings under proper control, but to put a stop to the general desolation and waste caused by "bush" and "grass" fires and prevent serious injury by the careless use of fires to established plantations especially during the dry seasons.

D. Morris,
Com. of Agriculture for the W. I.

Remarks of Dr. Nicholls:—I have been asked to read a paper at this Conference on bush fires and their harmfulness to the soil and to vegetation in those islands in which they are not controlled by legislative enactment. The subject is one which has engaged attention for some years past and I have spoken and written a good deal about these fires and their harmful effects in those West Indian Colonies in which they are allowed to rage without interference. It follows, therefore, that most of what I have to say to you has been made public by me elsewhere in some form or other.

Now-a-days, however, it too often happens that useful legislation is delayed until its necessity is brought home to the Government and people by frequent discussions, by the reiter-

ation of arguments and by the constant statement of facts bearing on the subject. This, I hope, will be the last effort that will have to be made to bring about the much needed legislation to control bush fires for I trust that the discussion which will follow the reading of my paper will crystalize the facts into such a concrete form as to allow the question to be dealt with satisfactorily by the various Governments concerned—the Imperial Department of Agriculture of course assisting by its advice and, if necessary, its initiative.

It may be well, perhaps, for me in the first instance to state briefly what steps have already been taken to bring the question before the public. In July, 1899, after a certain amount of discussion and correspondence, I raised a debate in the Legislative Council of Dominica on the destruction caused by bush fires in the island, by moving the following resolution:

Whereas, It is the custom during the dry season for peasants and others to clear lands by setting fire to dry grass and brush thereon;

Whereas, In many instances such bush fires having escaped control have run on to cultivated and forest lands causing considerable destruction and entailing great loss to planters as well as interfering with the progress of the Presidency towards prosperity;

And Whereas, Such fires, by destroying seedling indigenous trees, prevent the reafforestation of the waste lands on the leeward side of the island thereby causing these lands to remain barren;

Be it Resolved, That, in the opinion of this Council, it is desirable to empower the Governor by Legislative enactment to issue his proclamation in times of drought forbidding for certain periods, under severe penalties, the setting of fire on any lands whatever, unless in special instances permission in writing be given by an authorized official.

This motion gave rise to an interesting and instructive debate, during which the harmfulness of bush fires was borne testimony to by the Councillors, some of whom detailed the destruction worked by fire on their own properties. The resolution, I am glad to say, was passed unanimously by the Legislative Council, but the Government has not yet introduced a draft Ordinance to deal with the question.

In the West Indies and elsewhere in the tropics, under the generic term of bush fires are included all those conflagrations

both great and small, whether caused purposely or accidentally, that destroy the vegetable products of the soil. They may be divided into five classes as follows:

1. The fires deliberately set to burn down plants growing on limited areas with the object of destroying blights that are troublesome or are likely to become epidemic.

2. The fires sometimes made to the windward of cultivated lands affected by insect blights, so that the dense smoke may kill or drive away the pest.

3. The "burns," when high forest is cut down, the trees lopped, and fire is used to destroy the immense encumbering mass of wood so as to render the ground sufficiently clear for cultivation.

4. The "grass fires" that are set in dry seasons to destroy dry rank grass in order to induce a new and tender undergrowth for the grazing of cattle or for the grass-cutter's knife.

5. The ordinary "bush fires" of Dominica and other mountainous countries, by means of which the soil is cheaply and expeditiously cleared of brush and weeds, cut down or hoed up, on lands intended to be put into cultivation.

The first class of fires is simply a method adopted in the treatment of diseased plants, and is one of the heroic remedies of the plant physician when he endeavors to stamp out a dangerous epidemic. Such a remedy, however, is never used without careful precautions being taken to prevent unnecessary damage.

The second class of fires differ from the first in that the cultivated plants are not destroyed. This plan is frequently employed in some countries to rid plants of insect pests which are readily killed by the acrid smoke of burning green wood, bush and leaves.

The third class of fires are seen only in forest clearings where they are made use of to remove the massive tangle of fallen trees that encumber the ground. In the early years of settlement in the West Indies, when the islands were covered with primval forests these "burns" as they used to be and still are called, were part of the systematic work of all planters. Laborie, in his well-known work entitled "The Coffee Planter of Saint Domingo," published in 1797, gives particular directions as to the proper way in which the forest trees should be felled, and the branches lopped and strew, so as to get what he describes as a "good burn" that will clear the

land sufficiently for commencing cultivation. It is worthy of remark, however, that even this far-seeing writer, who penned his words over a century ago, deplored the destruction of certain constituents of the soil by these fires, and said "it is to be wished that burning could be dispensed with." Forest burns are now to be seen only in Dominica, St. Lucia, Trinidad, Jamaica and other islands in which there are still tracts of virgin forest; and, as such fires are essential and not fraught with dangerous consequences if due care be taken to prevent the conflagrations spreading, it is unnecessary further to consider them than to point out that legislation should not prohibit them, but should impose an obligation on the planter to prevent destruction of standing forest around the clearings.

The fourth class, or grass fires, are frequently seen in all the islands, more especially in dry districts. As I shall later on have occasion to show, these fires—which often take place every dry season on the same ground—are disastrous in their ultimate effects, and the crop of fresh grass that springs up after them does not compensate for the evil worked.

The fifth class comprises the ordinary and well-known bush fires of the tropics. They are especially common in Dominica, and, in the dry season, they may be observed in that island in all directions. Indeed, not only the peasants but also many proprietors of large estates invariably employ this wasteful method of clearing land for cultivation. The advocates of the system say that the fire gets rid of the brush and weeds expeditiously and cheaply, and some say that it also does lasting good by destroying the harmful insects on the soil. It may be conceded at once that vegetable matter is removed most easily by fire and if the removal of this matter were the only consideration no voice could be raised against bush fires. But a serious question has to be answered in the first instance, namely, is this vegetable matter in the form of leaves and brush of so little use to the land and the planter that its restruction is desirable? And, following on this question is the equally important one, does the planter gain or lose by converting all this organic material into inorganic matter in the form of ashes? Both these questions I hope to answer in such a way as to show that the clearing of land by fire is the worst and most wasteful system that the planter could adopt. I would pause here, however, to say a few words about the

erroneous idea that, in consequence of fire having been passed over the land, there is likely to be a long immunity from the depredations of insects for the reason that that all of them have been destroyed in the burnt area. Now, most insects, like the higher animals in a state of nature, wander about in search of food. They are kept in check by natural laws, the chief of which is the struggle for existence. And it is futile to expect that a circumscribed area can be kept free from insects by passing fire over it, for, as soon as fresh vegetation springs up on the burnt land, the insects will find it out and come in from all sides, so that in a short time the insect population of the patch will be as numerous as it was before the fire was set.

The harmful effects of these bush fires on the soil may be thus tabulated:

1. They destroy nitrogenous matters that would have gone to enrich the soil by the natural decay of the brush and leaves.

2. They destroy a certain proportion of the nitrogenous matters already in the upper layers of the soil.

3. They destroy the nitrifying microbes in the upper layers of the soil.

4. They sterize the upper layers of the soil and thus for a time prevent the fixation of nitrogen for the use of vegetation.

It may be roundly asserted that in all cultivated soils in the West Indies there is a deficiency of nitrogenous constituents which deficiency is usually attempted to be made up by the application of manures or by the digging in of plants more especially those of the pea family grown on the land for the purpose. It is therefore most essential that the planter should do everything possible to add to his soil all the vegetable matter he can get hold of, so that by its decay it may increase the deficient nitrogenous constituents. And yet it is the custom in Dominica and elsewhere to destroy these most valuable organic materials by fire, instead of turning them into the land to repay the expense and labor of so doing over and over again by the resulting increased crops and finer produce. Indeed, as I have said elsewhere, "To prevent the peasant from destroying what is necessary for the fruitfulness of his land, is to do him good by ensuring larger crops from his holding. Thus it is advantageous to the country generally that this wasteful destruction by fire of important constituents of the soil should be put an end to." Agricultural chemists tell us that every pound of nitrogen in the soil has a def-

inite value which may be expressed in figures. Were it possible to calculate the annual loss to planters on the basis of the money value of the nitrogen robbed from the soil annually by the bush fires, the total amount would be astounding.

But these bush fires not only destroy the vegetable matters intended by nature to enrich the soil, but they burn or bake the upper layers of the land, and this means that not only does the heat of the fire volatize the nitrogenous matters already prepared in the soil for the assimilation of plants, but that it also destroys the nitrifying microbes that are constantly at work to produce the rich organic material for further plant food. Thus it seems that fires on lands, especially in these countries, are utterly disastrous in many ways, that they cause a diminution of the quantity of the produce got from the soil, and therefore deleteriously affect the fortunes of the planters and consequently the prosperity of the country.

To prohibit these fires entirely, would be to prevent peasants and others from destroying what is necessary for the fruitfulness of the land, and so it would be sound political economy. But political economy and "the liberty of the subject" are sometimes contradictory terms, as in this instance, in which a man is held to have as much right to destroy the fruitfulness of a certain portion of the land as he has to pull down his house. But he must confine the destruction to his own property and not injure his neighbor's. Were these bush fires always limited to the circumscribed areas being cleared for cultivation there would be less to be said against them, and it is questionable whether in the present state of public opinion repressive legislation could be suggested with any chance of its adoption. But by carelessness, by ignorance and sometimes with malicious intent the conflagrations spread over and ravage large tracts of land, thereby destroying much valuable property.

The devastation caused by bush fires in Dominica alone is enormous, and it is undoubtedly a serious drag on the prosperity of the island. During the dry seasons the fires may be seen in all directions along the coast, in the valleys and on the hills. The absence of all control has rendered the people quite reckless in regard to them. If a peasant has to clear a few square yards of land to plant some "ground provisions," he will set fire to the dry brush in the afternoon and then gaily go home without troubling as to where the fire may run

to. A fire set in this way in Dominica not very long ago near to the sea, spread to neighboring lands and produced a conflagration that raged for days, running up a wide valley, destroying everything in its path and then reaching and seriously damaging cane and lime plantations on the hills. Dominica planters will tell the tale of how their cacao and other plantations have been greatly injured and the crops ruined by fires carelessly set in contiguous peasants' holdings; and they will tell also how their woodlands have been destroyed by similar fires. Indeed the losses due to these constantly recurring fires have become so great that legislation is urgently needed. If the matter were carefully inquired into, it would be found that, year by year, an increasing extent of land is being rendered barren by bush fires. As an illustration of the correctness of this statement I may bring forward the following facts concerning certain districts along the leeward coast of Dominica. Many years ago there were thriving coffee plantations on these lands, but now they are barren wastes of rocks covered in places with a thin skin of soil. During the wet season rank grasses and weeds spring up from seeds dropped by birds or blown by the wind. Were the land left to itself, by the operation of natural laws, soil would accumulate and seedling trees would grow and increase in number and variety, and, in a comparatively short time in our West Indian climate, a "secondary forest" would result, and then, by the judicious felling of a portion of the wood, the land could be gradually brought back to cultivation. But what really happens is that most of these waste lands are subjected to the ravages of bush fires every year, the seedling trees are killed out and the soil is left burnt and bare with no live roots ramifying in all directions to hold its particles together, so that, when heavy rains come, the loosened surface soil is washed to the valley or sea, and nothing but a rocky barren waste remains. This disastrous destruction of a cultivable soil has been going on for years and years in many islands in the West Indies, and it has resulted in the conversion of former fertile districts into barren wastes in Dominica, Montserrat, Antigua and all the islands to the north. It has not only made deserts where there should be gardens, but it has actually in places produced a disastrous effect on the climate. Mr. Watts can tell you of the evil effects of bush fires at the northern end of Montserrat and throughout Antigua. And I doubt not that many here can

bear testimony to the fact that I have not overestimated the urgency of the question.

In Dominica there is a dry, barren district known as the Grand Savannah, and years ago the late Dr. Imray endeavored to reclaim a portion of it by planting young Ceara rubber trees on it in all directions. The plants grew well and there was every hope that this barren waste would have been brought into remunerative cultivation, and that a new industry would have been established in the country; but unfortunately, the bush fires set by the peasants in the dry season swept over the plantation and killed out the rubber trees planted with so much care and expense. A similar attempt made later on to plant up portions of the Grand Savannah met with the same disappointing result, and it is clear that nothing can be done in Dominica to reclaim such barren lands until by legislative enactments the people are prevented from causing these extensive and disastrous conflagrations.

Legislation is also undoubtedly greatly needed in many of the other islands to abate the evils caused by these bush fires. It would not be advisable now to prohibit all fires on lands, but, without delay, an end should be put to the system whereby every person can at any time with impunity set fire to dry grass and brush and so produce a conflagration that may and often does cause great injury and loss to his neighbor's property, and that certainly retards the prosperity of the country. Although bush fires need not altogether be prohibited, they should not be allowed to be set in very dry seasons as they are then exceedingly dangerous; and, at other times, they should be so regulated that the evils I have brought to your notice may be mitigated if not entirely abolished.

Remarks by Dr. Morris:—Very diversified opinions have been expressed on this important subject, showing that it requires further consideration. There appears to be a misconception as to what is, and what is not, a legitimate use of fire in agricultural operations. In Jamaica the law referred to imposes penalties on the careless use of fire so long as it actually causes loss to property. The law is there, but it is perfectly useless unless enforced as instanced by Mr. Sharp. Forest lands belonging to absent or careless resident proprietors may still be burnt with impunity. On established plantations the injury, when it occurs, is more apparent and is usually dealt with. We come next to the use of fire in clearings for

coffee, cacao, &c. If it could be managed, I should like to see the use of fire absolutely prohibited; but where there is heavy tropical forest and where, after the trees are felled and lopped, there is a pile of vegetation several feet in depth covering the land, I fear it is impossible to get rid of this without the use of fire. But in all such cases the greatest precaution should be taken to prevent the fire from spreading. As in Trinidad, a license should be required beforehand, (or due notice should be given to neighboring proprietors and at the nearest police station as suggested at Jamaica) and in every instance an open space of, say, 20 or 30 feet be made all round the clearing. The periodical burning of pasture, or so-called waste lands, either by accident or design, is a ruinous process and every effort should be made to stop the practice. I trust that during the next twelve months members of the Conference will carefully study the subject, and also bring it before the local Agricultural Societies in order to have it thoroughly ventilated and ripened for future action. There is evidently a good deal to be done everywhere to guide and enlighten agriculturists in regard to the economical and judicious use of fire.

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CHEMICAL CONTROL IN SUGAR WORKS.

By Sigmund Stein, Liverpool, Sugar Expert and Technical Adviser for Sugar and Glucose Factories.

Chemical control in sugar factories is a question of the utmost importance, and is one of the things to which the greatest attention should be paid. On the Continent of Europe the fact was recognized long ago, but it is to be regretted that in this country and in our colonies proper importance is not often attached to the subject. It is the old conservative rule of thumb which governs most factories. Our factories in the colonies are very often reproached with using antiquated methods and antiquated machinery, but very seldom is it pointed out that what is most wanted is technical and scientific skill. It is not only the sugar industry which suffers in this direction; it may be said that nearly all the industries need improvement from the standpoint of chemical education.

Why is there such need of scientific chemical control? For no other reason than to ascertain and maintain the regular and profitable working of the factory. I have had occasion to speak with planters and sugar manufacturers from various

parts of the world, and have been very much astonished at the way in which their business is conducted. They either do not employ chemists at all, or employ what they call very clever handy men. They said their (so-called) chemist was very handy indeed, he could be employed anywhere, from loading the cane on to the wagons to store-keeping and book-keeping, in fact, almost everywhere. When they were asked in what way chemical control is secured, some only shrugged their shoulders and said "Oh, we never have any, we know all these things by experience without chemical or analytical aid." Sometimes they complain that they cannot get chemists. In one case I heard they had had a chemist, but he was a nuisance, always quarrelling with the manager and the foremen. For people who consider a chemist in a sugar works a nuisance there is no help, and any discussion with them is useless. Planters and sugar manufacturers from the Colonies frequently come to England and consult practical and scientific men. I suppose they get proper advice and go home enriched in knowledge and enlightened with regard to the new methods and principles. The good planter on his return tells his manager all that he has learned in Europe; the latter laughs, and says, "I know all this and have forgotten it long ago." The trouble the planter has taken and all his expenses go for nothing, and the work is carried on as it was done in his father's and grandfather's time. Of course, I do not intend this to apply to all factories, because I know there are many which are conducted in a proper scientific way, but the above has been my experience with many planters and manufacturers.

A chemist employed in a sugar works should have a scientific training, and if possible practical knowledge. He should not only be acquainted with analytical chemistry, but have some knowledge of agriculture, engineering, and commerce. A chemist in a sugar factory should be appointed by the proprietor or by the Board of Directors, to whom he has to send his weekly reports and whom he must consult on every important occasion. Such reports should be handed to the manager, that the latter may take note of them and be guided by them. The chemist should be properly paid and treated, and his engagement should be for a term of years. He should be able to take pleasure in his work, should have a chance of promotion, and be informed about everything going on in the

factory. He should be required to visit the factory regularly each day and night, see the whole process of working, and should be the scientific adviser of the manager and the foremen. The more he knows about the ins and outs of the factory, in every department, the more useful will he be to the factory. Such a chemist should not be a mere mechanic, working in the laboratory for a certain number of hours, and only pleased when the evening hour comes and he can leave his sanctum. It is necessary he should be on the best terms with the manager and the engineer. I have known cases where the manager and the engineer considered the chemist as a spy, a detective, an enemy, a creature whose presence was not required, and whose life was to be made miserable from day to day; and I have also known cases where the chemist was more disliked the more diligently he labored for the good of the place.

What is the duty of a chemist in a sugar factory? He must analyse and investigate all raw material, cane, beetroot, limestone, sulphur, &c., in short all the products which are employed in the factory, and all the materials used in the processes. He must be required to analyze them regularly, and to enter his observations or reports in a book, which should be initialled by the manager or proprietor. In factories where a process is employed in which poisonous materials are used, such materials must be examined frequently and at short intervals. He must further analyze the finished product, and also the products during the various processes. It is absolutely necessary that from time to time a full analysis of the sugars should be made, and properly recorded in the books. Every lot of sugar which is sold or bought must be analyzed, and the analysis recorded. How useful such a record is in cases of dispute I can say from my own experience. Disputes with customers and too exacting buyers are the frequent lot of every sugar manufacturer and merchant, and in these cases such a record is indispensable and forms the only reliable testimony.

In factories where poisons are employed in any of the processes every lot of sugar which goes to the customer must be analyzed in full before it leaves the premises. Samples of such sugars must not be taken at random from a big bulk, but from a small quantity, and if the quantity is large several samples must be taken and analyzed. In such processes, for

greater security, I would advise also the regular sending of samples of sugar to a public analyst to check the analysis of the chemist.

In cases where poisonous processes are used, the importance of regularly analyzing the sugar cannot be too strongly emphasized.

As a matter of course the chemist has to analyze the juice and syrups in all the different stages; also the bagasse in the case of the cane, the press cakes from the filter presses, the wash water from the filter bags, and all the by-products of the manufacture.

The chemist should have the opportunity of improving his knowledge of the agriculture, as carried on in the field. Samples of cane and beet should be taken during vegetation and analyzed. He must be allowed some insight into the trade of the factory, as very often his advice may be useful in the changing of processes. The boilerhouse should be visited regularly and the chimney gases analyzed.

Specially important is the animal charcoal or bone black plant, which should be under the constant control of the chemist. This is of the greatest importance in connection with sugar refineries and glucose factories, and I propose to deal with it in my next article in a later number of this journal.

In many continental factories a chemist or so-called chemist is employed only for the season, and of course he is only paid for the season, and when that is over he is no longer required or retained. Is this a tolerable situation for a competent man? With what pleasure can such a man work during the campaign, when he knows that when the latter is finished he has to turn out? He can only work perfunctorily and mechanically, just to finish his engagement. His employer, and the interests of his employer, are considered by him just in so far as they give him bread. Such a chemist employs half his time in thinking where and how he will find employment after the season is over, and where he will be the next season. Let us hope that this foolish system, too common on the Continent, will soon cease, and that the sugar industry will no longer be despised by clever chemists with scientific knowledge who are thereby compelled to earn their livelihood in other industries.

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The bounty on exportation of sugars from the country, may within the next few months be increased or decreased.

RELATION OF THE MOSQUITO TO MALARIA.

At a meeting of the National Biological Society, held November 19, 1900, Dr. C. W. Stiles, of the Department of Agriculture, read a paper, says the Chicago Record, advancing the theory that mosquitoes were entirely responsible for the disease we call malaria, and that without mosquitoes there would be no such disease.

"From a medical, biological and economic standpoint malaria is one of the most important diseases of man," said Dr. Stiles this morning. "The number of deaths annually, from this disease throughout the world must be reckoned in hundreds of thousands, Italy alone averaging about 15,000 a year, while the number of sufferers must be counted by millions. Its economic importance may be appreciated when we take into account not only the deaths, but the time lost by those who are afflicted. From a military standpoint it is also important, since in some localities 40 or 50 per cent of the troops suffer with malaria every year.

"The cause of the disease was discovered in Africa by Dr. Laveran, a French surgeon, twenty years ago. He is at present engaged at the Pasteur Institute, Paris. He discovered in the blood of microscopic organism which he first thought was a plant belonging to the genus Oscillaria, but which has since been recognized as animal and placed in the genus Plasmodium. Three distinct species are known—one which takes only forty-eight hours to complete its cycle in man. That is the cause of the ordinary tertian fever, where the patient has a chill on alternate days. The second form takes seventy-two hours to complete its development, and is the cause of the quartan fever. The third form is the cause of the so-called irregular estivio autumnal fever.

"Although the parasite was discovered twenty years ago, it is only within two years that its life history has been worked out. This is exceedingly complicated and has a direct bearing upon the origin of malarial infection. It contradicts many popular ideas regarding malarial diseases, and it will take some time to convince the public that the conclusions are correct. However, there is absolutely no ground for skepticism. The parasite runs through a double cycle, and thus appears to us in two distinct forms. One cycle is present in the blood of the human being, and is the cause of disease. This mis-

roscopic organism is known as an asexual animal—that is, males and females cannot be distinguished. The other cycle is found in certain mosquitoes of the genus Anopheles. In this stage the animal is sexual, and males and females can be clearly distinguished. The parasite takes a position in the wall of the mosquito's stomach and there forms minute germs known as sporozorites, which gradually work into the glands of the insect. Then whenever the mosquito bites a person she leaves a few germs under the skin. Only female mosquitoes attack human beings the male mosquitoes feeding upon vegetable matter. These germs, running through the asexual stage in the human being, reproduce so rapidly that the ordinary parasite of tertian fever gives life to about 560,000,000,000 within twenty days' time. If we would exterminate malarial diseases mosquitoes must first be exterminated, for it is impossible for the parasite of malaria to complete its work without the aid of the mosquito.

"While there is a popular impression that mosquitoes have something to do with malaria, people generally believe that malaria is caught either from breathing swamp air or drinking impure water. It must therefore be expected that the results of recent scientific investigation will be doubted. Biologically, however, there is only one exception to the law that malaria is transmitted by mosquitoes. If a person in a certain stage of malaria should happen to be attacked by a biting fly or some other insect, and that insect should infect a healthy person with malarial germs, it might develop a case of malaria. Such an occurrence, however, would be exceptional.

"It sounds radical," continued Dr. Stiles, "to assert that the existence of malarial diseases is absolutely dependent upon mosquitoes, but the sooner the fact is realized the sooner we will get rid of these diseases. Man is not the only animal that has malaria, but no other has the same malaria found in man. A large percentage of sparrows, swallows and pigeons have a disease which corresponds to malaria, but it is not transmissible to man.

"I have heard it suggested that in some regions where mosquitoes are plenty malaria is unknown, and that malaria exists where there are no mosquitoes, but in plenty of places where man exists yellow fever is unknown. Other conditions must prevail to produce malaria besides the presence of man. We must have man present for the disease to develop; second-

ly, we must have mosquitoes of the genus Anopheles to transmit the disease, and, thirdly, the germs which cause the disease. You can have mosquitoes and man in a given locality, but if the germs are not present the disease will not exist."

"Can you prove that malaria is not transmitted by the air or by drinking water?" Dr. Stiles was asked.

"This involves the demonstration of the negative," he replied. "It is impossible to demonstrate that the germs of malaria do not exist in the air. On the other hand, it is biologically impossible to conceive of their existence in the air. The burden of proof rests upon those who claim that malaria can be transmitted by breathing the air without the intervention of the mosquito. The idea that malaria is transmitted by the air or drinking water is purely a theory, without proof back of it. It should be recalled that mosquitoes fly at night. Hence it is natural for people to infer that night air causes malaria. Furthermore, mosquitoes are common near swamps; hence the idea is prevalent the air of the swamps caused the disease."

Dr. L. O. Howard, the entomologist of the Department of Agriculture, tells of certain districts where malaria has been practically stamped out by killing off the mosquitoes. He is of the opinion that boards of health and municipal authorities will be forced to take up the question of the extermination of the mosquito in a systematic manner and thus rid their neighborhoods of the cause of this disease. While aware that many physicians are still skeptical regarding the transmission of malaria by mosquitoes, he urges a sanitary campaign against the malaria mosquito, which can be recognized by those seeking to exterminate him. He can be detected in the dark as well as during the day. His note in singing is about four tones lower than the ordinary mosquito, a fact that corresponds with the usual distribution of parts in operas, where the villain always has the bass!

Dr. Howard says the best method of exterminating mosquitoes is by pouring kerosene on the stagnant water where they breed. This kills the larvae in the water and the adult female when she comes to lay her eggs. In cases where it is impractical to use petroleum, small minnows placed in the water will rapidly devour the mosquito larvae.—Scientific American.

THE WORLD'S DEMAND FOR TIMBER AND THE SUPPLY.

Readers of the Planters' Monthly are most strongly urged to read the following admirable article written by Raphael Zon, and published in The Forester, issued by the American Forestry Association, Washington.

The forests in the States of New South Wales are at present apparently little thought of, and our future timber supply is treated with an indifference which is simply appalling.

This seems to have been the case in the United States, where, not so very long since, the timber supply seemed to be illimitable, but suddenly it was discovered that the forests there, in the same manner precisely as here, were diminishing to an alarming extent, so much so that associations have been formed with the object in view of preventing this serious destruction as far as possible, and taking means to encourage planting and replanting.

Unless our settlers can be brought to realize the importance of maintaining a proper balance of timbered to cleared land, not only will our supply of wood fall short, but it seems to me, from many observations that I have made, that the climates of many districts will be affected for the worse. Some persons seem to think the rainfall will be affected, but that is a matter open for science to determine; but leaving out this debatable question, there seems to be no doubt the destruction of vast belts of timber will have other effects by no means beneficial to the districts where huge clearings are made.—W. S. Campbell.

"In the beginning of the nineteenth century, when the amount of coal obtained from the mines was insignificant and the means of transportation were inadequate, while industry and population were rapidly growing, an opinion prevailed that the existing supply of fuel would not last long, and that a fuel famine would follow. This common belief had a beneficial effect, for attention was drawn to the forests, and forest exploitation was placed on a more rational basis. A hundred years later, at the beginning of the twentieth century, we see that this prediction is not realized, and that the forests are able to furnish large amounts of fuel for unlimited time to come.

"Fear of a fuel famine no longer prevails, but instead, a timber famine is predicted—that is a lack of wood for struc-

tural purposes. This question was discussed at the International Congress of Sylviculture, held in Paris last summer, where M. A. Melard read a paper on 'The Deficiency of Wood Production in the World,' which has attracted general attention. Extracts more or less extensive appeared in nearly all forest magazines. Almost all of the following data are taken from the Revue des Eaux Forets, the organ of French foresters. The author touches upon a question which is of interest not only to a forester but to any man occupied with social and economic problems. The cardinal idea which he tries to emphasize can be briefly formulated as follows:—The amount of timber consumed at present all over the world exceeds the amount normally produced by the forests; hence this excess of consumption over the normal production is covered at the expense of the main wood capital, thus leading to devastation and destruction of forests in those countries which have still large forest areas, such as Canada, Russia, the United States. To prove this statement, Melard presents figures, seemingly carefully collected, concerning the export and import of timber of all civilized countries. The statistics of timber export and import, together with the information as to the magnitude of the available ripe crop, condition of the growing crop, rate of growth, and rate of wood consumption, are the only means by which a fair idea of the timber supply of a country may be obtained.

"M. Melard begins with England, and states that the British Isles are but little forested. The wood produced in England itself is of inferior quality and far below the amount necessary for the needs of its commerce and industries. It is obliged, therefore, to rely upon other countries for its wood. The average annual imports of timber into Great Britain during the past five years have exceeded the exports by 423,600,000 cubic feet, which is about 99 per cent. of its total consumption. This does not, however, represent the amount actually cut to cover England's need for wood. At least two-thirds of the timber imported by England consists not of logs, but of products already more or less fit for direct use; so that more than 423,600,000 cubic feet must be cut to supply the entire wood consumption. M. Melard, therefore, gives 529,500,000 cubic feet as the amount of timber which has to be cut to supply England's demand. This yearly timber supply costs England $94,000,000, and corresponds to the annual produc-

tivity of about 12,375,000 acres of such well managed and well kept forests as the Prussian State forests.

"Germany, although it has 35,000,000 acres of forests excellently managed, and yielding an immense revenue, demands increasingly greater quantities of wood, so that for the last ten years the amount of timber which it buys has doubled, and its value trebled. In 1898 the excess of importation over exportation was equal to 317,700,000 cubic feet, or 24 per cent of its total consumption.

"France produces a surplus of cord wood and small-sized timber, which it exports to neighboring countries, chiefly to England. But France is compelled to buy large-sized timber, and for the last five years the imports have exceeded the exports by 105,900,000 cubic feet. This amount is equal to half of the general productivity of all French forests, and 33 per cent of its total consumption.

"Belgium imports annually 63,540,000 cubic feet of timber more than it exports, or 47 per cent of its total consumption. Holland imports annually 21,180,000 cubic feet of timber wood, or 52 per cent. of its total consumption, for which it pays more than $3,000,000. Switzerland buys every year abroad 49,420,000 cubic feet of timber, or 35 per cent of its total consumption, worth nearly $3,000,000. The States of Southern Europe, such as Spain, Italy, Portugal, Greece, Turkey, Bulgaria, and Servia, whose industries are little developed, demand less timber than the countries above mentioned, but they buy considerable quantities of wood every year.

"Summing up these figures, it is seen that a large portion of middle, western, and southern Europe, with a population of 215,000,000, requires annually about 1.23 to 1.41 billion cubic feet of timber, for which is paid about $200,000,000. This amount of timber corresponds approximately to what might be produced on 25,000,000 to 50,000,000 acres of forest land.

"Who furnishes this timber? Austria-Hungary produces annually 794,250,000 cubic feet of wood, a considerable portion of which is exported to other countries, chiefly to Germany. Deducting the amount of wood which is imported by Austria-Hungary, its total supply of timber to the world market in 1898 was equal to 240,040,000 cubic feet. Although the export of timber from Austria-Hungary has been increasing during the last years, there are reasons to think that the greatest limit has been reached.

"The forests of Norway furnish a considerable quantity of timber to the world market. In 1898, 70,600,000 cubic feet of timber were sold, in addition to 49,420,000 cubic feet in the shape of pulp, making thus a total of 120,020,000 cubic feet. The forests of Norway are being exhausted, chiefly by clear cutting, which is practiced, since the pulp industry can utilize even small-sized timber. The timber supply of Sweden to the world market amounts to 317,000,000 cubic feet of timber, with 35,300,000 cubic feet of wood additionally in the shape of cellulose.

"Russia furnishes considerable quantities of timber, chiefly to England, Germany, France, Belgium and Holland. In 1897 there were sent to these countries 257,690,000 cubic feet of wood; in addition, Finland exported 158,850,000 cubic feet, making a total of 416,540,000 cubic feet. Besides the European countries just mentioned, a considerable amount of timber is exported also from Roumania, Bosnia, and Herzegovina.

"The forests of the United States, according to M. Melard, are to a great extent consumed, although the yearly exports amount to 116,490,000 cubic feet, worth about $20,000,000. This export is apparently carried on at the expense of the main wood capital, and, according to Prof. B. E. Fernow, whom M. Melard quotes as an authority, the present consumption of wood within this country itself is so great that the annual increment of the existing forest area is hardly able to satisfy it. With an increase of population, and greater development of industries, it is reasonable to expect not only a diminution of exports from the United States, but also an increase of imports of timber, especially from Canada.

"The forest resources of Canada are immense, the forest area is estimated as more than 800,000,000 acres, or 38 per cent of the total area. The export of timber from Canada in 1898 was approximately determined as 162,380,000 cubic feet, and its value as $27,600,000; to this must be added the export of pulp worth $1,200,000.

"The amount of timber supplied to the world market by Austria-Hungary, Russia, Sweden, Norway, the United States, and Canada approaches the figures given for the demand of timber, namely, about 1.23 to 1.41 billion cubic feet. From this we may conclude that at present the supply of wood on the world market covers the demand. The question is, how long will the exporting countries be able to furnish this

amount of timber? The price of timber is constantly rising; but in forestry this advance in value in contradistinction to other industries, does not lead to the increase of production, but, on the contrary, to more rapid destruction. The forests already in existence become depleted, the old stands are replaced by young ones, and often the cut areas are abandoned altogether. Taking into consideration the gradual decrease of the forests and the growth of population, M. Melard comes to the conclusion that the equilibrium between the demand and supply of timber in the world market, supported at present mainly by Russia and Canada, will not last more than fifty years, after which there will come scarcity, and as a consequence high prices.

"M. Melard briefly discusses also the possibilities of timber supply from the tropical countries; he considers that there is little to be expected from the virgin tropical forests of Africa and South America. While these forests are rich in woody species, comparatively few can be substituted for the wood of our conifers, so extensively used for many purposes. Besides, the rapidity with which everything decays in the tropics, and the soft, never-freezing soil make immense difficulties in transportation.

"M. Melard emphasizes the necessity of taking measures at once in order to avoid a timber famine in the future, because the maturing of a forest harvest requires many decades. His proposed remedy is to reforest many million acres of land unfit at present for agricultural purposes, to preserve the forests already in existence, to relieve forests of heavy taxes, and to lengthen the rotation in order to produce timber of large sizes.

"It is interesting to note that not M. Melard alone is concerned about the future timber supply. Here and there in the periodicals one meets with articles devoted to the question as to how much the present exploitation of the forests of a particular country corresponds to their normal productivity, and the most interesting fact is that the conclusions to which the authors of these articles come independently, seemingly confirm the opinion expressed by M. Melard as to the world's supply of wood. Thus, not long ago Prof. H. Mayer, in the Allgemeine Forst und Jagd Zeitung (1890, Nos. 3, 4 and 5), figured out the forest resources of Russia, and states as his opinion that Russia can furnish timber of large size only for-

fifty years, at cheap prices. Henry Gannet, Chief Geographer of the United States Geological Survey, in an article entitled 'Is a Timber Famine Imminent?' in the Forum for October, 1900, makes a similar study of the forests of the United States. Mr. Gannet estimates the amount of standing timber of merchantable size and quality in the country west of the Plains as 630,000,000,000 feet (B. M.). Of this 30,000,000,000 are to be found in the Rocky Mountain Region and 600,000,000,000 feet in the Pacific Coast States. These calculations are more or less accurate, as they are based on the results of the examinations which have been carried out with considerable care during the past three years, both within and without the forest reserves, for the purpose of aiding in the administration of the reserves with reference to the establishment of new reserves, and to gain information about the local supply of lumber in various parts of the West. The information concerning the eastern part of the country is scant; all estimates, therefore, must necessarily be mostly guess work. Mr. Gannet thinks that the average stand upon the wooded lands in the East does not exceed 1,500 feet per acre. The forest area in this part of the country is somewhat less than half a billion acres. The stand of timber upon it, therefore, may be about 750,000,000,000 (B. M.). Adding up together this amount and that estimated in the West (630,000,000,000 feet) the total stand in the country would appear to be in the neighborhood of 1,380,000,000,000 feet (B.M.). The rate of consumption is expressed in the annual cut which at present is a little more than 25,000,000,000 feet. The present stand, the increment not taken into account, would, therefore, supply the present rate of consumption for about fifty years. Further, it is estimated that the average acre of woodland produces annually one-third of a cord by growth. The annual increments of all our forests amounts, therefore, to over 300,000,000,000 feet (B. M.) of which only one-tenth or 30,000,000,000 feet consists probably of merchantable timber. This 30,000,000,000 as compared with the amount of timber annually cut (over 25,000,000,000 feet) at first glance seems to be a little in excess of the annual demands of our saw-mills, but if to these requirements be added the amount of timber annually destroyed by fire and other sources of loss it is altogether probable that the mere annual increment of our forests is hardly able to satisfy the existing need for wood."

FINANCIAL CONDITIONS IN JAPAN.

The financial condition of Japan is at present far from encouraging, and her bankers, statesmen, and business men are exerting every effort to avert a pending panic. The situation, as analyzed by the shrewdest financiers and statesmen of the Empire, shows that the Chinese indemnity secured at the close of the Japan-China war, together with large national loans, led to the exploiting of many public and private undertakings which caused money to be unusually plentiful among the coolie, or laboring, classes. This induced extravagant methods of living and is assigned as a potent factor in the large increase of imports. The amount of indemnity paid by China proved insufficient for the enterprises projected, and many millions were diverted from the customary channels of trade to carry forward these undertakings.

The large increase in imports was unfortunately accompanied by a falling off in exports during the past year, occasioned by the interruption of the Chinese trade, and a decreased demand for silk and habutai in America and Europe, so that last year the relation of exports to imports stood in the ratio of five to six, and 50,000,000 yen ($24,900,000) passed out of the country to settle Japan's balance of trade. This large outflow of specie led the Bank of Japan to raise its rate of interest, produced a glut of merchandise in the godowns of the importers, and caused a pronounced depreciation of stocks, bonds, and securities.

The scarcity of money for commercial and industrial purposes is all the more keenly felt because of the steady rise in price of all living expenses, which have increased during the last few years over 75 per cent.

Foreign capital declines to enter the Japanese market, although tempted by flattering rates of interest. The Government's recent effort to float a foreign loan has not proven a success, while school and municipal bonds, based upon safe security, are rendered undesirable to foreigners because of the faulty regulations and conditions attending their issue.

Both foreign and native banks decline loans on personal credit, and at the close of 1899 the total paid-up capital of the banks of the Empire, exclusive of the Bank of Japan, was $113,000,000, while at the same time they were carrying loans based on concrete security to the amount of $125,250,000, dis-

tributed as follows: Lands and houses, $50,500,000; goods, $51,250,000; public bonds, $23,500,000. From this, it will be seen that the banks have tied up in concrete investments a larger sum than their total paid-up capital, and Minister Watanabe observes that this fact is largely responsible for the present embarrassment felt in business circles.

The president of the Bank of Japan, at the last annual meeting of the shareholders, said: Throughout the year under review (1900), the specie reserve of the bank steadily dwindled month by month, the excess of imports over exports and a financial panic in Shanghai, owing to the Boxer trouble, all contributing to bring about this regrettable result. The depletion of specie and the increased demand for money occasioned by the Chinese trouble necessitated the bank's issuing notes beyond the prescribed limits in June and the succeeding months.

The closeness of the money market, combined with the dullness of trade and violent fluctuations of prices, is causing much alarm among merchants, manufacturers, and bankers, and more failures are imminent.—U. S. Consular Reports, 1901.

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THE ORIGIN OF GLUCOSE.

The absorption of the National Starch Co. and the Pope Glucose Co. by the Glucose Refining Co. as announced in our issue of May 28, marks a new stake in the career of the men who have made the glucose industry what it is today.

The glucose trust, properly speaking, is not a trust nor a combination. It is a monopoly, owning in fee simple practically every glucose plant in America.

The most startling move was the terrific commercial accident which transformed the Chicago sugar refinery into a vast glucose factory. To this extent the glucose trust is the direct result of a mistake, but a mistake so dramatic, so stupendous, so terrible that among sugar men there is no legend like it.

For a century two great Dutch families in New York have contended for supremacy in the sugar refining business of the United States—the Mathiessens and the Havemeyers.

In quest of something new, one of the Mathiessens met on a fateful day a famous German chemist from the University of Heidelberg. He was a hunchback, this man; a wizard; an

Edison and a Roentgen crushed into one misshapen frame. To the alert sugar refiner this man confided a momentous secret. He had converted in his laboratory the corn of America into the sugar of Cuba.

Demonstrations were made. In a carefully guarded laboratory the fact that the sugar could be produced was established beyond a doubt. The new product would polarize with cane sugar and showed the saccharine strength of the cane sugar—yet it was made from corn; and not being crystallizable, needed only to be mixed with cane sugar to make it pass as such.

The Mathiessens decided immediately to erect an immense plant for the new process.

The public was not asked into the venture; partners were not wanted; it was too good a thing. A trusted employe in Chicago was let in with the savings of a life-time—maybe $50,000.

While the great refinery was under way, rumors of the revolution in the sugar business reached the trade; the Havemeyers were sorely troubled. By way of coppering the deal they inspired newspaper articles hinting broadly at the adulteration.

There was the wizard; there was the sugar made from the corn—all that he had claimed for it. The refinery had confirmed what the laboratory had demonstrated, but the refiners stood aghast. All the contingencies had been provided for, they thought. Yet one little point had never been considered. It was so simple that a boy might have raised it before a dollar was put into the big undertaking.

The intention, as has been stated, was to mix the new sugar with cane sugar; it never occurred to any one of all those wise men that it wouldn't mix.

Was anything ever more frightful? It would not mix. Mix? They couldn't keep it in the same barrel with cane sugar.

For months the struggle was continued; every day meant the loss of thousands of dollars. Through sleepless nights and awful weeks the Heidelberg wizard toiled on—in vain. At the end of three months the president of the new company started for Europe to keep from losing his mind. A brother stepped into the breach.

One day the head-bookkeeper brought his balance sheet in to the brother who covered the ghastly retreat.

"Charge off this whole plant to profit and loss," he said, with frightful brevity, "and never let me see a balance sheet again. Open a new set of books and we will begin the manufacture of glucose with this plant and try to compete with our neighbors."

The wizard of Heidelberg still survives, probably today the greatest of living chemists. The man to whom he confided that particular stupendous discovery died years ago, broken hearted. Dead also is his great rival, Theodore Havemeyer, and oddly enough he, too, died a nervous wreck.

Such are the prices men pay for commercial supremacy—and they are envied.—St. Louis Grocer.

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LIVERPOOL SUGAR WORKS TO BE RESTARTED.

We have pleasure in stating, on the authority of Mr. Sigmund Stein, manager, that Messrs. Crosfield, Barrow & Co., sugar refiners, Vauxhall-road, Liverpool, have decided to restart their works within the next four or five weeks.

The principals are amongst the best-known business men in Lancashire, and the firm has been established for over 100 years; but about eighteen months ago, owing to the competition of foreign bounty-fed sugar, Messrs. Crosfield and Barrow were compelled to close their works and to discharge some 600 hands. They still retained a portion of their clerical staff and kept the works in good order in the expectation of a resumption of operations, for which they have to thank the Chancellor of the Exchequer and his new sugar duty.

Two other sugar refiners in Liverpool who were losing money from week to week, like Messrs. Crosfield and Barrow, gave up altogether in despair, and have gone out of the trade, so that they will not be able to resume at once, if ever. It had indeed been felt that it was only a question of time, if something was not done for the sugar industry for it to become extinct in England.

That "something" is the next tax of a half-penny a pound on sugar. A margin of profit for the refiner is thereby created which Mr. Stein said yesterday "will not make us millionaires, but will, at any rate, enable us to make both ends meet.

"For the first time since 1894," he said, "the British Government have recognized the necessity of taxing imported sugar. It is only a small tax, but it is a step in the right di-

rection; and we live in hope that they will see their way to do more for us at no distant date. From the sugar refiners' point of view, Sir Michael is a financial genius; and April 18 will always be a red-letter day in the sugar industry of the country."

The immediate effect of the tax in Liverpool, as stated, is that Messrs. Crosfield, Barrow & Co. will reopen, after eighteen months' idleness. They will employ about 600 hands directly, refining 60,000 tons of sugar per annum, and their anannual turnover in costs is estimated at a million sterling.

Most of the old hands will be available, and when the news got about among them yesterday they were almost in tears of thankfulness; for sugar refiners cannot at once turn their hands to any other industry, and they and their dependents have had a bitter time during the past eighteen months. It means a decent living for at least 2,000 people.

Nor will the benefit stop there; stores will be required for the works in the shape of machinery, coal, &c., cartage of sugar is another large item; and a multitude of smaller industries will all feel a renewed demand owing to the decision to reopen these works.

There is some talk of five refineries on the Clyde and two at Bristol, which had also been compelled to shut down, reopening; in fact the feeling on the Liverpool sugar market yesterday was one of extreme buoyancy, and as that buoyancy appears to be showed elsewhere, there is every room to believe that the new tax will lead to a general revival of the sugar refining industry of the country.

While the sugar refiners benefit to the extent of a halfpenny per pound on all sugars refined by them, the consumer will have to pay a halfpenny per pound more for his sugar and jam. Retailers in Liverpool yesterday quoted sugar a penny per pound higher, but it is expected that as soon as the market is steady the penny will drop one half; and probably the consumer will not grumble to pay a halfpenny more for his sugar, or howl at a halfpenny addition to the price of his jam, when he sees that a stimulus has been given to an old industry by the tax.

In Liverpool there are too few manufactories already, not to feel severely the closing of several sugar refineries. Liverpool lives by taking toll in the shape of dues on goods that

pass in and out, to and from the manufacturing centers. The reopening of sugar refineries is, therefore, all the more welcome as absorbing so much of the surplus labor of the city.—Liverpool Despatch.

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FIG-DRYING.

The following notes on fig-drying may be of some interest to those who are cultivating this most valuable of fruits. They are compiled from my own experience when acting under the present Fruit Expert, Mr. W. J. Allen, at Mildura, in connection with the Planters' Union. I am also indebted to Mr. C. Bogue Luffman, Principal of the Burnley Gardens, Richmond, Victoria, for many practical hints given during his visit some years ago to Mildura. Many methods have been advanced in the matter of fig-drying, and the knowledge acquired by Mr. Luffman in Spain and Italy has readily been adopted as practical and economical. In many instances, however, American (Californian) experience seems to point to a modification of the foreign methods, as it may in some cases be unnecessary to accurately follow out the rules laid down. In the district from which I write it will be found that much greater care would have to be exercised in the drying of figs, owing to the climatic conditions. The sweating process would not need to be so lengthy, and other minor points would have to be carefully watched. When the figs begin to milk and show small white seams they are cut from the trees and carefully placed on trays similar to the raisin-trays. A further great improvement would be to nail laths across the bottom of the trays just the thickness of the lath—say, about ⅛-inch. By placing the figs with the eye elevated on the rib, the sugary contents are prevented from leaking out, which otherwise might happen quite frequently. The figs are now placed in the sun to dry. They are turned to begin with every day, but when more dry, in the same way as we turn raisin-trays. Every night the trays are covered over, and for this purpose it is best to have all the trays in one place, and not scattered about, as is the custom with raisin-trays. The figs are sufficiently dry when they show the same dryness in the morning as in the evening. If not sufficiently dried they will afterwards puff up and spoil as if they were in a state of fermentation. In the evening the figs may seem sufficiently dried, but

in the morning they may be slightly puffed and swollen. They must be dried more. It is, however, a great danger to over-dry the fig. Such figs will get a cooked and earthy taste which will never leave them, and which will injure them or spoil their value entirely. It takes from five to twelve days to dry the fig, according to the weather. When dry they may be dumped in sweat-boxes for a few days, but the better way is to pack as soon as possible. Next, prepare a kettle or tub with boiling water, in which put enough common, unrefined—i. e., coarse—rocksalt to make a weak brine. Table-salt will not do. The more unrefined the salt is the better. Sea-water may be preferable, but it is unlikely that this can be obtained in districts where drying could be most easily carried out. Sea-water and rocksalt contain substances which preserve the moisture of the figs and keep them pliable. About three big handfuls of rocksalt to one gallon of water is enough. When the salt is dissolved and the water boiling, immerse the figs for two seconds. Immediately afterwards thumb the figs, working the eye downward and the stalk upwards, using as a guide the Smyrna fig as packed in 1-lb. boxes. This process is essential. First, it distributes the thickest skin around the eye of the fig evenly, and in eating we thus get equal parts of the thickest and equal parts of the thinner. Secondly, it places the fine skin of the stalk-end all on top, and when the figs are packed and pressed they present a beautiful smooth surface. The dipping of the figs may be dispensed with if the fruit is sufficiently pliable without it. But it is absolutely indispensable to dip them in salt water, and during the thumbing of the figs the hands of the packer must be constantly moistened by salt water, or sugar will stick to the fingers and make the operation almost impossible. After having dipped in the brine, the figs taste at first exceedingly salt, all the salt being on the surface, but after a few days the salt works into the fruit and gives it a peculiar appetizing taste, counteracting the excessive sweetness which otherwise would be too predominant. It will be found that the white flowery substance on the best Smyrna figs is due to uncrystallized grape-sugar, sweated out from the fig and to small crystals of rocksalt. In Smyrna, when the box is packed, and before it is pressed, the whole box is immersed in salt brine, so that the latter will fill all the pores and crevices between the figs;

and thus kill any possible insect eggs and germs of fungoids or bacteria deposited on the figs, which afterwards cause them to become wormy and spoil. The boxes when opened will often be found covered with incrustations of salt. The heavy pressing of the figs, which is always so strong that it causes them to burst at the stalk-end, is much objected to by consumers, as it evidently defaces the fig; but, nevertheless, this compression is absolutely necessary. It prevents insects from entering between the figs, and it prevents the air from entering, and thus drying out the figs.—N. S. Ag. Gazette.

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THE CONTEST FOR CONTROL.

The contending forces in the controversy over the control of the Northern Pacific and Burlington roads has reached a temporary agreement. It does not appear that a final settlement has been made. The Morgan-Hill project for acquiring possession of Burlington in the interest of the Northern Pacific and Great Northern alliance will be carried through upon the terms already announced; but it is supposed that the Rockefeller-Harriman interests in Union Pacific have obtained in some form that guaranty as to the operation of the Burlington system which was withheld from them before the furious buying of Northern Pacific caused the memorable corner. It is not probable that the grouping of American railways by community of interest and ownership will be checked by this bitter fight between the leading advocates of the community plan; but the groupers will hereafter feel very little confidence in the purity of each other's motives. They will move forward cautiously, after the manner of well-matched chess players, rather than with the easy freedom of unselfish good men working in partnership for the benefit of the public.

Among the many current rumors is one that the Standard Oil capitalists, with Gould and other allies, are planning a through transcontinental line by way of the Lackawanna (from New York), Wabash, Missouri Pacific, Denver and Rio Grande, and Central Pacific; intending to reduce by twelve hours the running time from New York to San Francisco. Another story, which appears to rest upon the authority of a director in the Hamburg-American Steamship Company, is that this German company (largest of its kind in the world)

is negotiating for control of the Atchison road to the Pacific, and for steamships plying between San Francisco and Hong Kong, with the purpose of girdling the globe with its land and water lines. As it has been supposed that the Pennsylvania road desired possession of the Atchison system, the negotiations of this German company may provoke another contest. Possibly the Rockefeller interest in the Union Pacific and Southern Pacific alliance will have something to say about the disposal of the Atchison, which lies between the Union and the Southern, paralleling both of them to the Pacific Coast.

It is the habit of some persons to say that in such a disturbance as took place on the Stock Exchange week before last only "the gamblers" suffer, meaning professional speculators, and those who buy and sell on the credit of their brokers. In this they are misled. Many who are not gamblers in any sense are hurt whenever there is a panic on the Exchange. If an agreement as to the price of Northern Pacific had not been reached here, and if a settlement of Northern Pacific contracts in London had not been deferred at the Morgan-Rothschild conference in that city, the effect of the disturbance upon banking and commercial interests in both countries would have been far-reaching and most deplorable. It is known that one of the leading banking houses in London would have failed, with liabilities of $80,000,000; that other old houses would have fallen with it, and that at least one foreign bank would have been embarrassed.

Such a crash would have been felt throughout the financial world; it would have affected banking houses in America, and a great host of people who have no dealings with Stock Exchanges would have suffered by reason of it. Fortunately, it was prevented. One lesson that these events should teach is that the pressure of intelligent public opinion should be applied for the restraint of great capitalists who thus jeopardize the interests of many by attempts to satisfy their greed or ambition.

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Honest work, honest goods, honest weights, honest measures and honest clerks, coupled with clean and attractive stores, courteous and attentive service, manly independence, and well considered enterprise, win a success that is pleasing because it is deserved.

THE RUSSIAN BEET-SUGAR INDUSTRY.

Russia with ample capital has built about thirty new beet-sugar factories for the present campaign. During the past four years the sugar consumption of the country has increased 138,000 tons, and the total consumption for 1898-99 is said to be 582,000 tons. Our readers may not be aware of the fact, but in Russia effort has been made to diminish the abuse of alcohol, and tea has been made even more popular than hitherto. As the country becomes developed, the population tends to centre in the large towns, under which circumstances the cost of transportation of sugar is diminished, and it becomes possible to sell the sugar at a lower price than it is sold at distant centres; this apparently has led to an increased consumption. The estimated sugar production for 1898-99 is 733,000 tons white sugar, so the surplus for exportation is only 150,000 tons. Russian sugar may be made for about 2.6 cents per pound. The financial situation of the sugar industry of the country is excellent. From recent facts published we conclude that the average factory paid dividends of 15 per cent, and in some cases as high as 40 per cent. The sugar question has become an important political issue; every possible means is adopted so as to meet all future demands of the population. It must not be forgotten that the system of railroads now building will open up cheap transportation from those towns where sugar is at present almost a luxury. Under existing conditions it is not possible for a Russian sugar manufactorer to export his sugars to Germany, etc., without an important money loss. The fact is the cost of manufacture of sugar in the empire is entirely too high.—The Sugar Beet.

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It has been announced at St. Petersburg, says a correspondent of the Financial News, that the import of saccharine is entirely to be prohibited in Russia, after having already been limited since 1890. The steps which are now to be taken by the Minister of the Interior in connection with the Minister of Finance, are: (1) To reckon saccharine amongst drugs of poisonous effect, and to allow the sale thereof only by chemists on a doctor's prescription; (2) to prohibit entirely the use of artificial sweetstuffs in the production of food and alimentary articles; (3) to issue new regulations with regard to the supervison, traffic, and sale of artificial sweetstuffs.

HONOLULU STOCK AND BOND EXCHANGE, OCT. 15, 1901.

STOCK	Capital Authorized	Shares Issued	Capital Paid up	Par Value	Last Sale
MERCANTILE					
C. Brewer & Co.	$ 1,000,000	10,000	$ 1,000,000	$ 100	415
N. S. Sachs' Dry G'ds Co. L'd.	60,000	600	.....	100	100
L. B. Kerr & Co., Ltd.	200,000	4,000	.....	50	35
SUGAR					
Ewa Plantation Company	5,000,000	250,000	5,000,000	20	25⅛
Hawaiian Agricultural Co.	1,000,000	10,000	1,000,000	100	265
Hawaiian Com'l & Sugar Co.	10,000,000	100,000	2,312,750	100	80
Hawaiian Sugar Company	2,000,000	100,000	2,000,000	20	26½
Honomu Sugar Company	750,000	7,500	750,000	100	130
Honokaa Sugar Company	2,000,000	100,000	2,000,000	20	33¼
Haiku Sugar Company	500,000	5,000	500,000	100	.....
Kahuku Plantation Company	500,000	25,000	500,000	20	23¼
Kihei Plant. Co. Ltd,	2,500,000	50,000	2,500,000	50	9½
Kipahulu Sugar Company	160,000	1,600	160,000	100	.....
Koloa Sugar Company	500,000	5,000	500,000	100	164
Kona Sugar Company	500,000	5,000	500,000	100	.....
McBryde Sug. Co. Ltd.	3,500,000	175,000	3,500,000	20	10
Nahiku Sug. Co. Ltd. Assess.	675,000	33,750	.....	20	.....
Nahiku Sug. Co. Ltd. Pd. up	75,000	3,750	75,000	20	.....
Oahu Sugar Co.	3,600,000	36,000	3,600,000	100	124
Onomea Sugar Co	1,000,000	50,000	1,000,000	20	24
Ookala Sugar Plantation Co.	500,000	25,000	500,000	20	10
Olaa Sugar Co. Ltd., Assess.	2,500,000	125,000	865,000	20	1¾
Olaa Sugar Co. Ltd., Paid up	2,500,000	125,000	2,500,000	20	12
Olowalu Company	150,000	1,500	150,000	100	.....
Paauhau Sug. Plantation Co.	5,000,000	100,000	5,000,000	50	.....
Pacific Sugar Mill	500,000	5,000	500,000	100	.....
Paia Plantation Company	750,000	7,500	750,000	100	250
Pepeekeo Sugar Company	750,000	7,500	750,000	100	.....
Pioneer Mill Company	2,250,000	22,500	2,250,000	100	100
Pioneer Mill Company Ass.	500,000	5,000	125,000	100	25
Waialua Agricultural Co.	4,500,000	45,000	4,500,000	100	60
Wailuku Sugar Company	700,000	7,000	700,000	100	370
Waimanalo Sugar Company	250,000	250,000	250,000	100	150
Waimea Mill Company	125,000	125,000	125,000	100	87
MISCELLANEOUS					
Wilder Steamship Company	500,000	5,000	500,000	100	100
Inter-Island Steam Nav. Co.	600,000	6,000	600,000	100	100
Hawaiian Electric Company	300,000	3,000	300,000	100	110
Honolulu R. T. & Land Co.	250,000	2,500	250,000	100	.....
Mutual Telephone Company	150,000	13,900	139,000	10	8
Oahu Railway & Land Co.	4,000,000	40,000	4,000,000	100	95
People's Ice & Refrig. Co.	150,000	1,500	150,000	100	85
BANKS					
First National Bank	500,000	5,000	500,000	100	.....
First Am. Sav. B. & Trust Co.	250,000	2,500	250,000	100	.....
BONDS	Amt. of Issue				
Hawaiian Govt. 5 per cent.	1,251,200	Dec. 31, 1900	.....	.....	96
Hilo Railroad Co., 6 per cent	450,000	.....	.....	.....	100
Hilo R. R. Co., 6 per cent	150,000	.....	.....	.....	.....
Hono. R. T. & L. Co, 6 p. c.	300,000	.....	.....	.....	.....
Ewa Plantation 6 per cent.	500,000	.....	.....	.....	101½
Oahu Railway & L'd Co 6 p. c.	2,000,000	.....	.....	.....	104¾
Oahu Plantation 6 per cent.	750,000	.....	.....	.....	.....
Olaa Plantation 6 per cent.	1,250 000	.....	.....	.....	.....
Waialua Agr. 6 per cent.	1,000,000	.....	.....	.....	102¼

PLANTATION DIRECTORY.

Island and Name.		Manager.	Post Office
OAHU.			
EwaPlantation Co	*	G. F. Renton	Honouliuli
Waianae Sugar Co. Ltd	***	Fred Meyer	Waianai
Waialua Agricultural Co	*	W. W. Goodale	Waialua
Kahuku Plantation Co	xx	W. A. Baldwin	Kahuku
Waimanalo Sugar Co	**	G. C. Chalmers	Waimanalo
Oahu Plantation Co	x	Aug. Ahrens	Waipahu
Honolulu Sugar Co	**	J. A. Low	Aiea
Heeia Agricultural Co. Ltd	*x*	W. W. McGowan	Heeia
Laie Plantation	x*x	S. E. Wooley	Laie
MAUI.			
Olowalu Sugas Co	**	E. Kruse	Lahaina
Pioneer Mill Co	x	L. Barckausen	Lahaina
Wailuku Sugar Co	**x	C. B. Wells	Wailuku
Hawaiian Commercial & Sugar Co	x*	W. J. Lowrie	Spreckiesville
Paia Plantation	x*	D. C. Lindsay	Paia
Haiku Sugar Co	x*	H. A. Baldwin	Hamakuapoko
Hana Plantation	xx	K. S. Gjerdrum	Hana
Hamoa Plantation	*x	J. R. Myers	Hamoa
Kipahulu Sugar Co	x	A. Gross	Kipahulu
Kihei Plantation	x*	W. F. Pogue	Kihei
Maui Sugar Co	‡	W. S. Akana	Huelo
HAWAII.			
Paauhau Plantation	**	Jas. Gibb	Honokaa
Hamakua Mill Co	*x	A. Lidgate	Paauilo
Kukaiau Plantation	x	J. M. Horner	Paauilo
Kukaiau Mill Co	*x	E. Madden	Paaulio
Ookala Sugar Co	o*x	W. G. Walker	Ookala
Laupahoehoe Sugar Co	*x	C. McLennan	Papaaloa
Hakalau Plantation	**	Geo. Ross.	Hakalau
Honomu Sugar Co	**x	Wm. Pullar	Honomu
Pepeekeo Sugar Co	*x	H. Deacon	Pepeekeo
Onomea Sugar Co	**x	J. T. Moir	Papaikou
Hilo Sugar Co	**	J. A. Scott	Hilo
Hawaii Mill Co	x	W. von Graevemeyer	Hilo
Waiakea Mill Co	*x	C. C. Kennedy	Hilo
Hawaiian Agricultural Co	*ox	C. M. Walton	Pahala
Hutchinson Sugar Plantation Co	**	G. C. Hewitt	Naalehu
Union Mill Co	*x	Jas. Renton	Kohala
Kohala Sugar Co	*	E. E. Olding	Kohala
Pacific Sugar Mill	x**	D. Forbes	Kukuihaele
Honokaa Sugar Co	x**	Jno. Watt	Honokaa
Kona Sugar Co	xxx	J. Cowan	Holualoa
Olaa Sugar Co	xx*	F. B. McStocker	Olaa
Puna Sugar Co	xx*	W. H. Campbell	Kapoho
Halawa Plantation	x*x	T. S Kay	Kohala
C. F. Hart, (Niulii)	*x	R. Hall	Kohala
Hawi Mill & Plantation	‡‡	John Hind	Kohala
KAUAI.			
Kilauea Sugar Co	**	G. R. Ewart	Kilauea
Gay & Robinson	x*x	Gay & Robinson	Makaweli
Makee Sugar Co	**x	G. H. Fairchild	Kealia
Grove Farm Plantation	x	G. N. Wilcox	Lihue
Lihue Plantation Co	x	F. Weber	Lihue
Koloa Sugar Co	x	P. McLain	Koloa
McBryde Sugar Co	*x	W. Stodart	Eleele
Hawaiian Sugar Co	x*		Makaweli
Waimea Sugar Mill Co	*	J. Fassoth	Waimea
Kekaha Sugar Co	x	H. B. Faye	Kekaha

Key	Honolulu Agents	
*	Castle & Cooke	(4)
**	W. G. Irwin & Co	(8)
***	J. M. Dowsett	(1)
x	H. Hackfeld & Co	(9)
xx	M. S. Grinbaum & Co	(2)
xxx	McChesney & Sons	(1)
*x	T. H. Davies & Co	(8)
**x	C Brewer & Co	(7)
x*	Alexander & Baldwin	(5)
x**	F. A. Schæfer & Co	(2)
xx*	B. F. Dillingham & Co	(2)
x*x	H. Waterhouse & Co	(3)
x	C. Bolte	(1)
†	Wong Kwai	(1)